

## **SPECIFICATION**

To All Whom It May Concern:

Be It Known That I, Julious A. Myers, a citizen of the United States and a resident of the City of Oak Ridge, County of Cape, State of Missouri, whose full post office address is 257 Memory Lane, Oak Ridge, Missouri 63769, and have invented certain new and useful improvements in

**COLLAPSIBLE BOX FOR ATTACHMENT TO VEHICLES**

## **CROSS REFERENCE TO RELATED APPLICATIONS**

Not Applicable.

## **STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT**

Not Applicable.

## **BACKGROUND OF THE INVENTION**

This invention relates in general to collapsible containers, and more particularly, to collapsible containers capable of being attached vehicles such as an all terrain vehicle ("ATV") and the like. Such vehicles are frequently driven substantial distances through rough and difficult terrain, where there may be no facilities available. Therefore, when using such vehicles, it is often desirable to transport equipment, tools, food and other items in a container attached to the vehicle. However, at other times, the container may not be necessary, or the container may be desirable only for one leg of a trip. Accordingly, it would be beneficial to have a collapsible container that can be attached to a vehicle such as an ATV that is capable of opening for use and folding to a collapsed state when not in use.

## **BRIEF SUMMARY OF THE INVENTION**

Briefly stated, a container of the present invention comprises a body, a top and a hinge assembly, the body comprising a front, a back, a bottom, a first side and a second side. The front, back, first side and second side are all pivotally connected together to define an open box, the box being selectively movable between a first position in which the

box is formed and a second position in which said box is collapsed. The hinge assembly has a first pivot assembly and a second pivot assembly. The first pivot assembly is connected to the top and the second pivot assembly is connected to the body, such that the hinge assembly enables the top to be positioned substantially flat against the body when the box is in the collapsed position. The said front, back, bottom and sides of the container are foldable relative to the top to lie substantially flat against said top when the body is in its collapsed position.

The container may further comprise a bracket that is capable of attachment to a mounting surface, and which is pivotally connected to the body is pivotally by the second pivot assembly. The bracket may comprise an upper end and a lower end, the upper end being angled relative to the lower end to define a bend in the bracket, the upper end being capable of attachment to the mounting surface.

The container may further comprise a brace, the brace being capable of attachment to the bracket and further being capable of placement behind the mounting surface such that the brace will hold the bracket to the mounting surface. The mounting surface may be a vehicle rack, in which case the bracket will be configured for attachment to the rack. The container may also comprise a universal mount that is capable of attachment to a variety of vehicle racks, in which case the bracket will be attached to the universal mount.

The hinge assembly may further comprise a lug connected to the bracket, the lug extending upwardly from the bracket. The first and second pivot assemblies are connected to the lug at spaced apart positions on said lug. The connections of said first and second pivot assemblies thereby define first and second pivot points. The hinge assembly may further comprise a third pivot assembly and a fourth pivot assembly, such that the third pivot

assembly is attached to the lug and the fourth pivot assembly is attached to the container top. The third pivot assembly may be attached to the lug between the second pivot assembly and the bracket. Further, the length between the third and fourth pivot assemblies may be such that the fourth pivot assembly must contact the lug when placing the top over the body of the container. The first hinge assembly end may be attached to the bracket in proximity to the bend.

Alternately, the container comprises a body, a top and a bracket, the bracket comprising an upper end and a lower end, the upper end being angled relative to the lower end to define a bend in the bracket, the upper end being capable of attachment to a mounting surface, wherein the bracket is pivotally connected to the container.

Alternately, the container comprises a front, a back, a bottom, a first side and a second side, wherein each of said top, front, back, first side and second side are pivotally connected together to define an open box, the box being selectively movable between a first position in which the box is formed and a second position in which said box is collapsed, the body further comprising a lip, the lip being formed along an edge of and extending angularly away from one of said front, back or bottom, the lip thereby elevating the pivot point of the one of said front, back or bottom, such that the container is substantially flat when the box is in the collapsed position. The container may further comprise a top, the top being pivotally connected to the body and capable of laying substantially flat against the box.

## **BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS**

The objects of the invention are achieved as set forth in the illustrative embodiments shown in the drawings which form a part of the specification.

Figure 1 is a top view of an embodiment of the collapsible container of the present invention in its fully open configuration;

Figure 2 is a perspective view of the bracket for securing the collapsible container to a fixture;

Figure 3 is a perspective view of the hinge for securing the collapsible container to its bracket;

Figure 4 is a partial cutaway perspective view of the brackets and braces securing the collapsible container to a vehicle rack;

Figure 5 is a perspective view of two braces and associated screws for securing the collapsible container to a fixture;

Figure 6 is a perspective view of the collapsible container of the present invention in a partially opened configuration while being attached to a rack on an all terrain vehicle;

Figure 7 is a perspective view of the collapsible container of the present invention in its collapsed configuration while being attached to a rack on an all terrain vehicle;

Figure 8 is a perspective view of the collapsible container of the present invention in its fully open configuration with its lid open while being attached to a rack on an all terrain vehicle;

Figure 9 is a perspective view of the collapsible container of the present invention in its fully open configuration with its lid closed while being attached to a rack on an all terrain vehicle;

Figure 10 is a perspective view of the collapsible container of the present invention in its backrest configuration while being attached to a rack on an all terrain vehicle;

Figure 11 is a perspective view of the collapsible container of the present invention in its tabletop configuration while being attached to a rack on an all terrain vehicle;

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

## **DETAILED DESCRIPTION OF INVENTION**

An illustrative embodiment of the novel collapsible container 10 of the present invention is shown generally in Figure 1 in an unfolded position. Alternate configurations of the container 10 can be seen in Figures 6 through 11. The container 10 (Fig. 1) includes a body 11, a hinge assembly (not shown in Fig. 1) and bracket (not shown in Fig. 1). The body 11 is preferably, but not necessarily, formed from six sheets of generally flat steel, or any number of other suitable materials, and includes a rectangular back 12, a rectangular top 14, a rectangular bottom 16, a rectangular front 18, and two trapezoidal sides 20 and 22. The shortest edges of the trapezoidal sides 20 and 22 each have a set of tabs 21 and 23, respectively.

The upper and lower edges of the back 12 are bent upwards at an angle of approximately 90 degrees to form lips 24 and 26 respectively. A hinge assembly (not shown) connects the top 14 to the back 12. A first piano hinge 30 is attached to and runs along the full length of the lip 26. The bottom 16 is attached to the first piano hinge 30. In this way, the back 12 and the bottom 16 are pivotally attached to one another, and the bottom 16 is spaced away from the back 12 by the width of the lip 26 at the first piano hinge 30.

A second piano hinge 32 is attached to the edge of the bottom 16 opposite the first piano hinge 30, and to a long edge of the front 18, such that the bottom 16 and the front 18 are pivotally attached to one another. A third piano hinge 34 is attached along the length of a short edge of the back 12 and along the edge of the first side 20 opposite the tabs 21, such that the back 12 and the first side 20 are pivotally attached to one another. In similar fashion, a fourth piano hinge 36 is attached along the length of the short edge of the back 12 opposite the side having the third piano hinge 34, and along the edge of the second side 22 opposite the tabs 23, such that the back 12 and the second side 22 are pivotally attached to one another. Although piano hinges are used to pivotally or hingedly connect the surfaces of the body 11 together, other types of hinges could be used as well.

As can be further seen in Figure 1, the back 12 has two sets of holes 38 and 40, positioned near opposite sides of the back 12 near the lip 24. The holes 38 and 39 are used for attachment of the body 10 to a fixture as will be described in detail herein. Additionally, the front 18 has two sets of slots 40 and 41, that correspond to the slots 21 and 23, when the body is configured to be a container, as will be described in detail herein. The top 14 also has two sets of holes 42 and 44, that are used to attach the top 14 to the hinge assembly (not shown) as will be in detail herein.

A bracket 50 is shown in Figure 2. The bracket 50 is preferably formed of plate steel, but may be comprised on any other suitable material. The bracket 50 has an upper end 52 and a lower end 54. The lower end 54 is approximately 50% longer than the upper end 52. The upper and lower ends 52 and 54 meet at a bend 56 in the bracket 50, such that the bracket 50 is generally L-shaped.

A lug 58 is attached to the bracket 50 at the bend 56 such that the lug 58 is generally perpendicular to the upper end 52 and extends away from the bend 56 generally in the opposite direction from the lower end 54. The lug 58 is generally rectangular in horizontal cross-section, and from a side elevational view, has a curved upper surface. A first bore 60 and a second bore 62 pass through the lug 58. The bores 60 and 62 are generally parallel with one another and with the bend 56. A hole 64 is located generally in the center of the upper end 52 of the bracket 50.

The lug 58 is the foundation for a hinge assembly 70 (Fig. 3) that is attached to the bracket 50. The hinge assembly 70 includes four parallel pivot pins 72, 74, 76 and 78. The pivot pins 72 and 76 are formed from a single U-shaped metal rod and such that the pivot pins 72 and 76 are joined together at the U-shaped end and connected together at the other end by a link 80. The pivot pins 74 and 78 are pivotally joined at both ends by links 92 and 94. The pivot pin 72 is positioned within the first bore 60 of the lug 58. Cotter pins 84 secure the link 80 to the ends of the pivot pins 72 and 76. Sleeves 86 are positioned on the pivot pin 72 on either side of the lug 58. A plate 88 is pivotally joined about pivot pin 76. The plate 88 has holes 90 to enable the attachment of the plate 88 to the top 14 of the container 10. The pivot pin 74 is positioned within the second bore 62 of the lug 58, and pivot pin 78 is positioned in proximity to the lug 58. Links 92 and 94 are placed on the ends of pivot pins 74 and 78 to hold the pivot pin 78 in parallel alignment with the pivot pin 74. A sleeve 96 is positioned on the pivot pin 78 between the links 92 and 94 to maintain the desired separation of the links. The links 92 and 94 are secured to the pivot pins 74 and 78, for example, by expanding the ends of the pivot pins.



A plate 98 is pivotally attached to the pivot pin 78. The plate 98 has holes 100 to enable the attachment of the plate 98 to the back 12 of the container 10. The distance between the pivot pins 72 and 76 is such that when the top 14 is attached to the plate 88, the plate 88 will contact the forward edge of the links 92 and 94, as the top 14 is rotated over the links. This creates a friction latching mechanism to assist in retaining the top 14 in its forward position. The container 10 has two brackets 50, each bracket 50 having its own hinge assembly 70.

The upper end 52 of the bracket 50 may be attached to a vehicle rack 102 comprising two or more inverted U-channel members 104. (Fig. 4). The brackets 50 are fixedly attached to the rack 102 by placing each bracket 50 on the top of the rack 102 along the top of a member 104. Machine screws 106 are placed through the holes 64 in the upper ends 52 of the brackets 50 and corresponding holes in the rack 102 (not shown). The machine screws 106 are screwed into braces 108 (see Fig. 5) positioned in the underside of the members 104 (Fig. 4). As shown in Figure 7, when the brackets 50 are mounted to the rack 102, the bracket bend 52 is positioned atop the rack and the bracket legs 54 extend downwardly.

As can be seen from Figures 6 through 11, the container 10 is shown mounted to a rack 102 on an all-terrain-vehicle ("ATV") 110. Because of the novel design of the container 10, the back 12, top 14, bottom 16, front 18, and sides 20 and 22, may be positioned in a number of configurations. In Figure 6, the components of the container 10 are shown in a generally open configuration. In Figure 7, the container 10 is shown in its collapsed configuration atop the rack 102. Figure 8 shows the container 10 in the configuration of an open box with the top 14 laying substantially flat against the rack 102. In this configuration,

the tabs 21 (not shown) and the tabs 23 are positioned through the slots 40 and 41 in the front 18. The tabs 21 and 23 each have holes 25. As can be readily understood by one of skill in the art, pins (not shown) or other devices may be placed in the holes 25 to secure the front 18 to the sides 20 and 22, in the configuration depicted in Figure 8. When the container 10 is formed, as seen in Figure 8, the container back rests against the bracket legs 54. Hence, the bracket legs 54 prevent pivoting of the container 10 when it is in its formed position.

Figure 9 shows the same configuration as Figure 8, but with the lid 14 rotated to a closed position atop the box. Flexible straps 112 attached to the top 14 are stretched across the top portion of the front 18, and secured to hooks 114 attached to the front 18. In addition, a universal mount 115 can be attached to the rack 102. The universal mount 115 comprises a cross-member having series of holes and slots that are configured for ready attachment to a variety of vehicle racks. When the universal mount 115 is attached to the rack 102, the brackets 52 are attached to the universal mount 115 instead of directly attaching to the rack 102.

In Figure 10, the container 10 is configured to form a backrest for the rider of the ATV 110. Latches, clips, or other such securing devices, which are readily known to one of ordinary skill in the art, may be used to retain the container 10 in the configuration shown in Figure 10. Figure 11 shows that the container 10 may be laid substantially flat against the seat of the ATV to form a stable horizontal platform for eating, working, or other such activities.

Additional variations on the basic construction are also available. For example, the exact shape and size of the container 10 can be varied to form larger or smaller box

configurations. The height, depth and length of the container 10, and thereby all of its components, may be longer or shorter. The container may be formed of material having holes, slits or other openings, or may be formed of materials such as mesh or fencing, so long as the components of the container 10 have sufficient structural integrity to perform the functions outlined in this disclosure. Of course, one of ordinary skill in the art will recognize that structural members may be added to strategic positions on or in the container 10 to allow the use of a variety of materials.

Lips or ledges may be added to the top edges of the back 12, front 18 and/or sides 20 and 22, to provide for a more stable platform for the top 14 when positioned atop the container 10 when in the open box configuration. Other mechanisms well known in the art may be substituted for the combination of tabs 21 and 23 and slots 40 and 41, including but not limited to, all variety of latches, hooks, knobs, braces and pins. The hinge assembly 70 may be formed with any variety of pins, sleeves, bushings and bores, so long as the pivot pins 72, 74, 76 and 78 are all parallel and enable the proper functioning of the container 10 as described and claimed herein.

The brackets 50 and braces 108 may be of a variety of shapes and sizes to accommodate attachment to a number of mounting surfaces. The container 10 may only need one bracket 50 or more than two. The lug 58 does not need to be integral with the bracket 50, but may be attachable in a number of manners known in the art, including but not limited to, a slot and pin assembly, a slot and dovetail arrangement, or the lug could be screwed onto the bracket 50.

The detailed description above illustrates the invention by way of example and not by way of limitation. This description clearly enables one skilled in the art to make and use the

invention, and describes several embodiments, adaptations, variations, alternatives and uses of the invention, including what I presently believe is the best mode of carrying out the invention. As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.